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Committee on the Peaceful Uses of Outer Space

International cooperation in the peaceful uses of outer space: activities of Member States

Note by the Secretariat*

Addendum

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* The present document contains information received from Member States between 14 February and 19 April 2001.

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I. Introduction

1. At its fifty-fifth session,[1] the Committee on the Peaceful Uses of Outer Space agreed that the Scientific and Technical Subcommittee should consider an agenda item entitled "General exchange of views and introduction to reports submitted on national activities". In its resolution 54/67 of 6 December 1999, the General Assembly endorsed the recommendation of the Committee[2] that the Secretariat invite Member States to submit annual reports on their space activities. In addition to information on national and international space programmes, the reports could include information on spin-off benefits of space activities and other topics requested by the Committee and its subsidiary bodies.

2. Information received from Member States as at 13 February 2001 is contained in the note by the Secretariat of 4 December 2000 and addenda (A/AC.105/752 and Add.1 and 2). The present document contains information received from Member States between 14 February and 19 April 2001.

II. Replies received from Member States

Canada

1. Canada achieved many accomplishments during 2000, including renewed participation in various international cooperation agreements, improvement of services in disaster management, as well as participation in Mission Endeavour and the installation of solar panels on the International Space Station.

2. The Canadian Space Agency (CSA) has continued to promote global cooperation in the peaceful uses of outer space, to encourage activities with important contributions to the global space knowledge base and to ensure that space science and technology continue to provide social and economic benefits for Canadians and humanity. In pursuit of those objectives, the Canadian space programme focuses on five areas: earth and environment, generic space technologies, space science, satellite communications and human presence in space.

3. The present report describes some of Canada's activities in space during the year 2000.

1. International cooperation

4. In June, CSA renewed its membership in the European Space Agency (ESA) by signing of a 10-year cooperation agreement, in the presence of the Canadian Prime Minister, at ESA headquarters in Paris. The agreement recognizes the long-standing history of cooperation between Canada and its European partners and the socio-economic benefits that come from the mutual promotion of the peaceful development of space science and technology. Working with European firms, Canadian companies are expanding their partnership in Earth observation and satellite navigation and building the next generation of satellites offering clients

[1] *Official Records of the General Assembly, Fifty-fifth Session, Supplement No. 20* (A/55/20), para. 119.

[2] Ibid., *Fifty-fourth Session, Supplement No. 20* (A/54/20), para. 119.

access to faster and cheaper high-speed communications, multimedia and the Internet.

5. In October, CSA also signed a number of new agreements with the National Aeronautics and Space Administration (NASA) of the United States of America that will strengthen the overall NASA/CSA relationship. The agreements involve areas such as scientific satellites, utilization of the Synthetic Aperture Radar Satellite (RADARSAT), and potential collaboration on the exploration of Mars, to name a few. The Administrator of NASA and the President of CSA noted the history of successful cooperation in space between Canada and the United States, reviewed ongoing cooperation between the two agencies and noted their satisfaction with the status of those activities.

2. Earth observation

6. In Earth observation, Canada's RADARSAT-1, launched in 1995, continues to prove its worth to scientists and commercial users alike. The satellite has demonstrated its usefulness in many fields, including disaster management, agriculture, cartography, hydrology, forestry, oceanography, ice studies and mineral and oil exploration.

7. The year also provided new insights into the mysteries of Arctic Sea ice, thanks to the unique abilities of RADARSAT. Using RADARSAT's special sensors to take images at night and to peer through clouds, NASA researchers can now see the complete ice cover of the Arctic. This allows tracking of any shifts and changes, in unprecedented detail, over the course of an entire winter. The radar-generated high-resolution images are up to 100 times better than those taken by previous satellites. The satellite is expected to play an important role in helping scientists monitor Earth's climate shifts.

8. A second mapping of the Antarctic is now under way, with coverage to regions north of about 80° S. The Modified Antarctic Mapping Mission (MAMM) is a collaboration between NASA and CSA to map Antarctica using synthetic aperture radar (SAR). Utilizing RADARSAT-1 fine beams will provide an opportunity to image many of Antarctica's fast glaciers, whose extent was revealed through data collected in 1997, during the first mapping project of the Antarctic. MAMM will also attempt to capture extensive data suitable for unprecedented interferometric analysis of the surface velocity field. The mission will attempt to answer questions about the stability of the Antarctic ice sheet and the response of the ice sheet to changes in climate.

9. In another project, a mosaic of the United States was created through the compilation of 190 high-resolution images captured over the continent. The United States mosaic is part of an ongoing CSA project that has also generated mosaics of Antarctica and Canada. Currently under way is a comprehensive data mapping of Africa, which is projected for completion in 2001.

10. CSA is also supporting the Application Development Research Opportunity-2 (ADRO) programme, which aims at developing innovative approaches and applications for data acquired by RADARSAT-1. ADRO-2 is building bridges between academic researchers and established space-based companies and forging alliances with international partners, enhancing knowledge, expertise and

technologies applied to the growing field of Earth observation. NASA is also participating in the initiative.

3. Space science

11. Progress has been made in the joint United States/Canada Far Ultraviolet Spectroscopic Explorer (FUSE) project. Through participation in the project, CSA has provided two fine-error sensors, which guide and navigate the FUSE to enable it to point in precisely the right direction to make its exacting scientific observations. The project focuses on the study of "hot stars", the massive stars that are responsible for recycling within their host galaxies matter both from stellar winds and supernovae. Results indicate large differences between stars of the same mass in two galaxies. By studying why stars behave differently in different galaxies, understanding may be reached of how the first stars in primeval galaxies began the process of enriching their galaxies and affecting later generations of stars visible today.

12. Scheduled for launch in 2002, SCISAT-1's atmospheric chemistry experiment will study ozone depletion in the atmosphere. SCISAT-1 will improve understanding of the chemical processes that control the distribution of ozone in the Earth's atmosphere, especially at high altitudes, with particular emphasis on the processes occurring over Canada and the Arctic.

13. The Canada/Japan/United States mission to study the Earth's lands, oceans, clouds and atmosphere is producing exciting results. The CSA measurements of pollution in the troposphere (MOPITT), launched on the NASA Terra satellite in 1999, measure "radiances" in the atmosphere to determine the amount of carbon monoxide and methane present. During the five-year mission, MOPITT will continuously scan the atmosphere below it to provide the world with the first long-term, global measurements of carbon monoxide and methane gas levels in the lower atmosphere. The results collected through MOPITT and other instruments will help scientists predict long-term effects of pollution, understand the increase of ozone in the lower atmosphere and guide the evaluation and application of shorter-term pollution controls.

14. CSA, Environment Canada and the Natural Sciences and Engineering Research Council of Canada, in partnership with universities and industry, successfully launched and retrieved the giant research middle-atmosphere nitrogen trend assessment (MANTRA) balloon from Vanscoy, Saskatchewan. This was the second flight of the MANTRA project, the first having taken place in August 1998. The MANTRA research project will help scientists determine the effectiveness of the reduction of ozone-depleting chemicals undertaken since the Montreal Protocol on Substances that Deplete the Ozone Layer, a global agreement to protect the ozone layer. That environmental treaty, adopted in 1987 and since signed by over 160 countries, uses scientific research to set limits for the worldwide production of ozone-depleting substances in order to ensure that ozone levels return to normal and do not become threatened again in the future.

15. 26 February 2000 marked over 160 years of continued Canadian scientific research into the mysteries of the Northern Lights, when the CSA GEODESIC experiment was successfully launched into the Earth's upper atmosphere. The purpose of GEODESIC is to study how the energy deriving from the Northern

Lights warms the high terrestrial atmosphere. The instrument examined small pockets of energy in the Earth's upper atmosphere where the Northern Lights are found. Those pockets can reach temperatures of over 1 million °C, although the reason they exist is still unknown to scientists. Fluctuations in the Northern Lights are believed to have caused widespread power outages on Earth and disruptions of orbiting satellites.

16. The CSA thermal suprathermal analyser (TSA) was successfully launched on 4 December 2000 from Sptizbergen, Norway, on board a Japanese sounding rocket on a scientific mission to learn more about the evolution of the atmosphere. The TSA instrument is designed to analyse the complexities of ion composition and distribution in Earth's upper atmosphere. Measuring and understanding the behaviour of the very lowest energy particles and gases is vital in order to understand the origin and composition of plasma in the Earth's magnetosphere. Greater knowledge of the past and the evolution of the Earth's atmosphere and ionosphere will help scientists discern the planet's history and possibly its future.

17. Following the success of the OSTEO experiment, the Canadian osteoporosis research performed during United States Senator Glenn's return to space in 1998, CSA is now developing follow-up experiments to be conducted on a future space shuttle mission. It is expected that research performed by Senator Glenn may offer the potential of direct health benefits here on Earth.

4. International Space Station

18. While Astronaut Julie Payette was the first Canadian to visit the Space Station in May 1999, Marc Garneau followed in November 2000. Garneau successfully completed his mission, which involved the deployment of solar panels, the main source of power for the International Space Station. He was also assigned the responsibility of monitoring space walks for the STS-97 mission.

19. In March, CSA proudly awarded robotic operator's wings to two NASA astronauts, the first astronauts to obtain the qualification to operate the Space Station remote manipulator system (SSRMS). Astronaut Chris Hadfield will become the first Canadian ever to perform a space walk when he delivers and installs the SSRMS to the Space Station during the STS-100 mission in April 2001.

5. Communications

20. Canada has set up a public private sector partnership to develop and launch a specialized multimedia communications satellite payload. In collaboration with industry, CSA and the Communications Research Centre will develop, deploy and operate an innovative Ka-band high-speed multimedia communications payload. The multimedia payload, a key part of the $600 million ANIK F2 satellite to be launched in 2002, will commercialize the use of the Ka band. The payload offers the promise to deliver cheaper, faster and more highly effective communications services and to expand access to tele-medicine, tele-learning, tele-working, electronic (e)-commerce, high-speed Internet and government services to citizens living in urban, rural and remote communities throughout Canada.

21. Finally, CSA established the John H. Chapman Award, aimed at honouring individuals who have manifested exceptionally innovative qualities for the greater benefit of the Canadian space programme. The first recipient of the award was

John S. MacDonald, in recognition for his exceptional contribution. Mr. MacDonald is co-founder of MacDonald Dettwiler and Associates, a world-class provider of information and operational Earth observation systems. He is widely renowned for his expertise in remote sensing, image processing and maximizing the extraction and use of information coming from remotely collected data.

6. Relevant web addresses

Canadian Space Agency	http://www.space.gc.ca
Canadian Centre for Remote Sensing	http://www.ccrs.nrcan.gc.ca
Communications Research Centre	http://www.crc.doc.ca
Government of Canada	http://canada.gc.ca
Natural Resources Canada	http://nrc.gc.ca

Slovakia

1. The Government of Slovakia has created the Committee for Research and Peaceful Uses of Space as an advisory committee for the Council of the Government of the Slovak Republic for Science and Technology. Its Chairman, Štefan Luby, the President of the Slovak Academy of Science, personally leads the Committee, which is responsible for working at the meetings of the Network of Space Science and Technology Education and Research Institutions for Central Eastern and South-Eastern Europe.

2. The point of contact in Slovakia is:

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